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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/427,639	10/27/1999	SHUNPEI YAMAZAKI	0756-2053	3558

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EXAMINER

NELSON, ALECIA DIANE

ART UNIT	PAPER NUMBER
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2675

DATE MAILED: 12/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/427,639

Applicant(s)

YAMAZAKI ET AL.

Examiner

Alecia D. Nelson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10/29/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. ***Claims 1-9*** are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admittance of prior art in view of Ernstoff et al. (U.S. Patent No. 4,090,219) Ohwada et al. (U.S. Patent No. 4,750,813), and Choi (U.S. Patent No. 6,784,034).

With reference to **claims 1-4, 6, 7, and 9** the Applicant discusses the conventional art of a field sequential driving method in which one image frame is divided into three subframes and each one of the red, green and blue backlights are turned on

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for one-third frame duration to display an image corresponding to that color for one-third frame duration. The Applicant also discusses that the video signal supplied to the liquid crystal panel is obtained by compressing an original red, green, and blue video signal entered from outside to one-third the time axis direction, which relates to the functionality of the claimed n-speed field sequential color signal generation circuit, and that the red, green and blue LEDs are turned on successively during their corresponding LED turn-on periods (T_r , T_g , T_b), which relates to the functionality of the claimed backlight (see page 2, line 11-page 3, line 21).

The admitted prior art fails to discuss displaying each of the red, green, and blue images in each of the subframes. Even though it is taught that the display device of the conventional art is an AM-LCD there is no discussion of the specific components of the LCD panel as claimed.

Ernstoff et al. teaches a liquid crystal field sequential color display in which one image frame comprises 2 fields, each of which comprises a red image, a green image, and a blue image (see column 7, line 68-column 8, line 34). With reference to **claims 2, 4, and 7** Ernstoff et al. teaches that the frame comprises 2 fields, however it would be possible to have 3 fields in each frame by shortening the duration of each field thereby further reducing the amount of flicker seen by the observer. With further reference to **claims 3 and 6**, Ernstoff et al. teaches that three light sources (204, 206, 208) representing each of the primary colors are operated one at a time, in a repetitive sequence by switch (216), at a rate such that the complete 3-color sequence is completed more rapidly than the flicker fusion frequency. A synchronizing means (222)

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controls switching means (216) supplying power to the light sources in the manner indicated in Fig. 10 (see column 7, lines 40-58).

Ohwada et al. teaches an AM-LCD wherein the display comprises a glass substrate, which is known in the art to have an insulating surface, wherein the active matrix circuit (1), the driver circuits (4, 5), and a voltage-timing transforming circuit (7) and all or a part of a timing generating circuit (8) are formed in the form of thin film transistors on a glass substrate (see column 3, lines 15-20). While teaching the usage of the TFT circuits as claimed, there fails to be any discussion towards the TFT's having a channel region comprising crystallized silicon, however this is conventional to those skilled in the art.

Choi teaches a method for fabricating a thin film transistor wherein the TFT has a channel region comprising crystallized silicon (see column 4, line 66-column 5, line 13).

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to allow displaying RGB images in each subframe as taught by Ernstoff et al. along with the drive method of the admitted prior art on an AM-LCD to be constructed similar to that which is taught by Ohwada et al. and Choi thereby allowing all or a majority of the circuitry to be composed as an integrated circuit which requires less space in order to provide the user with a liquid crystal field sequential display that has improved display quality with a reduced amount of flicker observed by the user.

With reference to **claims 5 and 8**, none of the reference teach that the liquid crystal display is a ferroelectric liquid crystal display device, however as explained

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above Ohwada et al. does teach the usage of a LCD device wherein a ferroelectric type liquid crystal is well known type to be used in display device.

4. **Claims 10-31** are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admittance of prior art in view of Ernstoff et al. and Ohwada et al. as applied to **claims 3 and 9** above, and further in view of McDowall et al. (U.S. Patent No. 5,528,262).

With reference to the claims neither the admittance of prior art, Ernstoff et al., nor Ohwada et al. teach the particular type of device that contain the liquid crystal device.

McDowall et al. teaches, with specific reference to **claims 10 and 21**, that construction of a color display with particular advantages for head mounted and head coupled displays (see abstract. However, with reference to **claims 11-20 and 22-31**, McDowall et al. further states field sequential displays are of great interest in situations that require small color displays (see column 2, lines 33-44).

Therefore it would have been obvious to allow for the liquid crystal display device with a reduction in noticeable flickering to be constructed in a plurality of different devices to thereby increase the marketability of the product.

5. **Claims 32-34** are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admittance of prior art in view of Ernstoff et al., Ohwada et al, Choi, and Konno et al (U.S. patent No. (5,327,229).

With reference to **claims 32-34** the Applicant discusses the conventional art of a field sequential driving method in which one image frame is divided into three subframes and each one of the red, green and blue backlights are turned on for one-third frame duration to display an image corresponding to that color for one-third frame duration. The Applicant also discusses that the video signal supplied to the liquid crystal panel is obtained by compressing an original red, green, and blue video signal entered from outside to one-third the time axis direction, which relates to the functionality of the claimed n-speed field sequential color signal generation circuit, and that the red, green and blue LEDs are turned on successively during their corresponding LED turn-on periods (T_r , T_g , T_b), which relates to the functionality of the claimed backlight (see page 2, line11-page 3, line 21).

The admitted prior art fails to discuss displaying each of the red, green, and blue images in each of the subframes. Even though it is taught that the display device of the conventional art is an AM-LCD there is no discussion of the specific components of the LCD panel as claimed.

Ernstoff et al. teaches a liquid crystal field sequential color display in which one image frame comprises 2 fields, each of which comprises a red image, a green image, and a blue image (see column 7, line 68-column 8, line 34). Ernstoff et al. teaches that the frame comprises 2 fields, however it would be possible to have 3 fields in each frame by shortening the duration of each field thereby further reducing the amount of flicker seen by the observer. Ernstoff et al. also teaches that three light sources (204, 206, 208) representing each of the primary colors are operated one at a time, in a

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repetitive sequence by switch (216), at a rate such that the complete 3-color sequence is completed more rapidly than the flicker fusion frequency. A synchronizing means (222) controls switching means (216) supplying power to the light sources in the manner indicated in Fig. 10 (see column 7, lines 40-58).

Ohwada et al. teaches an AM-LCD wherein the display comprises a glass substrate, which is known in the art to have an insulating surface, wherein the active matrix circuit (1), the driver circuits (4, 5), and a voltage-timing transforming circuit (7) and all or a part of a timing generating circuit (8) are formed in the form of thin film transistors on a glass substrate (see column 3, lines 15-20). While teaching the usage of the TFT circuits as claimed, there fails to be any discussion towards the TFT's having a channel region comprising crystallized silicon, however this is conventional to those skilled in the art.

Choi teaches a method for fabricating a thin film transistor wherein the TFT has a channel region comprising crystallized silicon (see column 4, line 66-column 5, line 13).

Konno et al. teaches the usage of a photo-conductive layer (23) in which the impedance thereof is fairly constant by controlling the light absorbance characteristics of the dielectric mirror (24) as such that a leakage of light is reduced and thereby providing a uniform amount of light received by the display.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to, combine that which is taught by Konno et al. as explained to the liquid crystal display having the driving circuitry composed similar to that which is taught by Ohwada et al. and Choi, the drive method as taught by Ernstoff et al. and that which

is admitted by the applicant with reference to conventional art, to thereby provide a liquid crystal field sequential display that has improved display quality and reduced amount of flicker observed by the user.

6. **Claims 35-45** are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admittance of prior art in view of Ernstoff et al., Ohwada et al., Choi, and Konno et al. as applied to **claims 32-34** above, and further in view of McDowall et al. (U.S. Patent No. 5,528,262).

With reference to the claims neither the admittance of prior art, Ernstoff et al., nor Ohwada et al. teach the particular type of device that contain the liquid crystal device.

McDowall et al. teaches, with specific reference to **claim 35**, that construction of a color display with particular advantages for head mounted and head coupled displays (see abstract. However, with reference to **claims 36-45**, McDowall et al. further states field sequential displays are of great interest in situations that require small color displays (see column 2, lines 33-44).

Therefore it would have been obvious to allow for the liquid crystal display device with a reduction in noticeable flickering to be constructed in a plurality of different devices to thereby increase the marketability of the product.

Response to Arguments

7. Applicant's arguments filed 8/6/04 have been fully considered but they are not persuasive. The applicant argues that the combination of reference fails to teach or

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suggest a n-speed field sequential color signal generation circuit comprising a third thin film transistor over the substrate. However, as acknowledged by the applicant, Ohwada et al. teaches a LCD device wherein the scanning side driving circuit, the signal side driving circuit, the voltage-timing transforming circuit, and timing generation circuit are formed in the form of a thin film transistor on a glass substrate together with the TFT transistors (see column 3, lines 14-20). Even though Ohwada doesn't specifically teach a n-speed field sequential color generation circuit being formed of a thin film transistor on the glass substrate, the teaching of the other circuitry, mainly the timing generation circuit, is taught to be formed of thin film transistors. Wherein the n-speed field sequential color generation circuit generates turn-on timing signals RGB for turning on the LEDs, it would have been obvious to one having ordinary skill in the art at the time of the invention to allow the n-speed field sequential color generation circuit to be represented in the teachings of Ohwada by the timing generation circuit, which is formed of a thin film transistor along with the scanning and signal side driving circuit and the voltage-timing transforming circuit. Thereby allowing the device to have a monolithic structure, which is well known in the art. Further it would have been obvious to allow the color generation circuit to be formed of a thin film transistor in order to provide high mobility and current driving ability.

Applicant's arguments with respect to **claims 1, 3, 6, 9, and 32-34** have been considered but are moot in view of the new ground(s) of rejection.

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Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alecia D. Nelson whose telephone number is (703) 305-0143. The examiner can normally be reached on Monday-Friday 9:30-6:00. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

adn/ADN
December 11, 2004

AMR A. AWAD
PRIMARY EXAMINER

